END TERM EXAMINATION

THIRD SEMESTER [BCA] NOVEMBER-DECEMBER 2017

Paper Code: BCA-201   **Subject: Mathematics-III**

(Batch 2011 Onwards)

Time: 3 Hours   **Maximum Marks: 75**

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each unit.

Q1 (a) Find the lower and upper quartiles for the following distribution.

Scores	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184
Frequency:	1	3	2	4	4	6	10	8	5

Scores	185-189	190-194	195-199
Frequency:	4	2	1

(b) Mean and S.d of a sample of 100 observations were calculated as 40 and 5.1 respectively. But by mistake one observation 40 was read as 50. Calculate the correct mean and S.d.

(c) Given r = 0.8, $\sum xy = 60$, $\sigma_y = 2.5$ and $\sum x^2 = 90$. Find the number of items (x and y are deviation from their arithmetic average).

(d) Differentiate PERT and CPM.

(e) Explain Vogel's Approximation method.

(5x5=25)

Unit-I

Q2 (a) The first quartile of the following data is 21.5.

Class:	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Frequency:	24	?	90	122	?	56	20	23

Find the missing frequency and hence the values of mode. Given the total frequency is 460.   **(6.5)**

(b) Find mean deviation about the mean for the following data: **(6)**

Xi:	2	5	6	8	10	12
fi:	2	8	10	7	8	5

Q3 Calculate the mean and standard deviation for the following distribution:**(12.5)**

Marks:	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of Students:	3	6	13	15	14	5	4

Unit-II

Q4 Calculate the coefficient of correlation by Karl Pearsons method from the following data relating to overhead expenses and cost of production:**(12.5)**

Overheads:	80	90	100	110	120	130	140	150	160
Cost:	15	15	16	19	17	18	16	18	19

Q5

(a) From the data, obtain the regression equations: (6.5)

X:	6	2	10	4	8
Y:	9	11	5	8	7

(b) For a bivariate data, the $\bar{X} = 20$, $\bar{Y} = 45$. The regression coefficient of Y on X is 4 and that of X on Y is $\frac{1}{9}$. Find: (6)

(i) The coefficient co-relation.

(ii) The standard deviation of X if the standard deviation of Y is 12.

Unit-III

Q6

(a) Find the maximum value of $4x+5y$ subject to the constraints by Graphical method. (6.5)

$x + y \leq 20$

$x + 2y \leq 35$

$x - 3y \leq 12$

$x \geq 0$

$y \geq 0$

(b) Write the dual of following LPP. (6)

Max $Z = x_1 - x_2 + x_3$

Sub: $x_1 - x_2 - x_3 = 5$

$2x_1 + 5x_2 - x_3 \leq 2$

Also solve the dual LPP.

Q7

(a) Use simplex method to solve the L.P.P. (6.5)

Maximize $Z = 3x_1 + 4x_2 + x_3$

Subject to Constraints

$x_1 + 2x_2 + 3x_3 \leq 90$

$2x_1 + x_2 + x_3 \leq 60$

$3x_1 + x_2 + 2x_3 \leq 80$

where $x_1, x_2, x_3 \geq 0$

(b) Solve: Min $Z = 2x_1 + 3x_2 + x_3$. (6)

Sub: $x_1 + x_2 - 2x_3 \geq 1$,

$x_1 - x_3 = 5$,

$x_1, x_2, x_3 \geq 0$.

Unit-IV

Q8

A company has four plants P₁, P₂, P₃, P₄ from which it supplies to three markets M₁, M₂, M₃. Determine the optimal transportation problem plan from data giving the plant to market shifting costs, quantities available at each plant and quantities required at each market. (12.5)

Plants → Market ↓	P₁	P₂	P₃	P₄	Required
M₁	19	14	23	11	11
M₂	15	16	12	21	13
M₃	30	25	16	39	19
Availability	6	10	12	15	43

Q9

A company has 5 jobs on which to do 6 operators. Each operator can be assigned to one and only one job. The cost of each operator on each Job is given below. What are the job assignment which will minimize the cost? (12.5)

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P2/3

Operator	Jobs				
	J₁	J₂	J₃	J₄	J₅
O₁	6	2	5	3	6
O₂	2	5	8	7	7
O₃	7	8	6	9	8
O₄	6	2	3	4	5
O₅	9	3	8	9	7
O₆	4	7	4	6	8
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P3/3